Electronic Version
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Claims

[c1] A well tool comprising:
a housing forming a protection fluid chamber in fluid communication with a discharge port;
a protection fluid disposed within the protection fluid chamber; and
a moveable mechanism in functional connection with the protection fluid chamber in a manner to expel a portion of the protection fluid when the moveable mechanism moves.

[c2] The well tool of claim 1 wherein the protection fluid is a high-viscosity fluid.

[c3] The well tool of claim 1 wherein the protection fluid is a high-density fluid.

[c4] The well tool of claim 1 wherein the protection fluid includes a lubricant.

[c5] The well tool of claim 1 further including a flapper.

[c6] The well tool of claim 5 wherein the discharge port is positioned proximate the back of the flapper.

[c7] The well tool of claim 1 wherein the moveable mechanism includes a slide sleeve.

[c8] The well tool of claim 5 wherein the moveable mechanism includes a slide sleeve.

[c9] The well tool of claim 1 wherein the moveable mechanism includes a first slide sleeve in functional connection with a second slide sleeve.

[c10] The well tool of claim 9 wherein the slide sleeves are in functional connection with a flapper.

[c11] A debris removal system, the system comprising:
an isolation valve having a flapper;
a housing having a protection fluid chamber in fluid communication with a discharge port positioned proximate the flapper;
a protection fluid contained within the protection fluid chamber; and
a slide sleeve in functionally connection with the flapper wherein when the slide sleeve is moved to open the flapper protection fluid is expelled through the discharge port to remove debris from proximate the flapper.

[c12] The well tool of claim 11 wherein the protection fluid is a high-viscosity fluid.

[c13] The well tool of claim 11 wherein the protection fluid is a high-density fluid.

[c14] The well tool of claim 11 wherein the protection fluid includes a lubricant.

[c15] The well tool of claim 12 wherein the protection fluid includes a lubricant.

[c16] The well tool of claim 13 wherein the protection fluid includes a lubricant.

[c17] The well tool of claim 11 further including a second slide sleeve in function connection with the first slide sleeve.

[c18] The well tool of claim 17 wherein the protection fluid is a high-viscosity fluid.

[c19] The well tool of claim 17 wherein the protection fluid is a high-density fluid.

[c20] The well tool of claim 17 wherein the protection fluid includes a lubricant.

[c21] A method of removing debris from the vicinity of a portion of a well tool, the method comprising the steps of:
storing a protection fluid in a well tool; and
expelling the protection fluid proximate a portion of the well tool.

[c22] The method of claim 21 wherein the expelling step includes moving a moveable mechanism.

[c23] The method of claim 21 wherein the well tool is a flapper type isolation valve having a flapper.

[c24] The method of claim 23 wherein the protection fluid is expelled proximate the back of the flapper.

[c25] The method of claim 21 wherein the expelling step includes moving a slide sleeve.

[c26] The method of claim 25 wherein the expelling step includes moving a slide sleeve.

[c27] The method of claim 25 wherein the slide sleeve carries the flapper.

[c28] The method of claim 26 wherein the slide sleeve carries the flapper.

[c29] The method of claim 21 wherein the protection fluid includes a lubricant.

[c30] The method of claim 24 wherein the protection fluid includes a lubricant.

[c31] The method of claim 26 wherein the protection fluid includes a lubricant.

[c32] The method of claim 28 wherein the protection fluid includes a lubricant.

[c33] A well tool protection system, the system comprising:
a flapper;
a housing having a protection fluid chamber in fluid communication with a discharge port positioned proximate the flapper;
a protection fluid contained within the protection fluid chamber;
a first slide sleeve positioned in moveable connection with the flapper wherein the first slide sleeve is held in a static position by a first breakable member;
a second slide sleeve positioned in moveable relation to the first slide sleeve;
a load support positioned below the second slide sleeve in a manner supporting the second slide sleeve in a set position;
a retainer maintaining the load support in a set position; and
a second breakable member maintaining the retainer in a set position.

[c34] The system of claim 33 wherein the load support carries a substantial portion of the load from the differential pressure across the flapper when the flapper is in a

closed position.

[c35] The system of claim 33 wherein the load support is positioned within a groove formed in a flow tube.

[c36] The system of claim 35 wherein the load support has a wedge face that matches a wedge face in the groove formed in the flow tube.

[c37] The system of claim 36 wherein the load support carries a substantial portion of the load from the differential pressure across the flapper when the flapper is in a closed position.

[c38] A well tool protection method comprising the steps of:
supporting a force from a pressure differential across a flapper when the flapper is in a closed position;
actuating a first slide sleeve to move the flapper to an open position;
parting a first breakable member allowing the first slide sleeve to move;
equalizing the pressure differential across the flapper;
parting a second breakable member releasing a second slide sleeve for movement;
urging a second slide sleeve into movement by movement of the first slide sleeve;
moving a load support;

expelling the protections fluid; and
moving the flapper to the open position.

[c39] The method of claim 38 wherein the force from the differential pressure across the flapper is carried substantially by the load support.

[c40] The method of claim 39 wherein the load support is a split ring.

[c41] The method of claim 39 wherein the load support is positioned within a groove formed in a flow tube.

[c42] The method of claim 39 wherein the load support has a wedge face that matches a wedge face in the groove formed in the flow tube.